B-1224

Variable Crop Share Leases

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Variable Crop Share Leases

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Renting or leasing farmland is part of many modern farming operations and increases average farm size in U. S. agriculture. Economies of size are vitally important to farm operations as they strive to cope with the continuous price-cost sqeeze in the agricultural industry. Without the availability of land to rent, the average size of farming operations would be smaller, and unit costs would be higher.

Renting land has financial rewards for both the operator and the landowner. For the tenant, leasing does not require the large capital outlay associated with land purchase. This allows farmers with limited capital to expand and obtain the economies of larger-sized operations. The land rental market also helps retired farmers and investors who own land but do not or cannot operate it themselves. They can own land and receive a cash return on their investment but not assume all of the rigors and risks of farming.

TYPES OF LEASES

Farmland leases fall into two broad categories: cash and crop-shares. Under a cash lease, the tenant pays for the rights to farm the land. Cash leases usually provide the tenant operator with more freedom in making management decisions, and the tenant must accept more of the risks. Since the tenant assumes more risks, the landlord usually receives a lower net rental than he would under a crop-share arrangement.

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Under crop-share leases, the landlord and tenant share the crop and, therefore, share many of the risks of farming. During "bad" years, the tenant pays lower rent because of lower prices, poor yields or both. In "good" years, the landowner receives more income than a cash lease would pay. Over time, the share lease should pay the landowner a higher average return than a cash lease and should financially benefit the landlord for sharing the tenant's risks.

Crop-share leases tend to develop traditional sharing ratios within geographic areas. Throughout much of Texas 1/3 and 2/3 shares of grain crops and 1/4 and 3/4 shares of cotton have been typical.

A principle of equitable crop-share leases requires the variable inputs which directly determine yield levels to be shared by the landowner and the tenant in the same ratio as they share the product. These inputs (i.e., fertilizer, insecticide, irrigation, water, etc.) are easily identified in each situation, but seldom do current lease contracts include sharing all of them.

EXAMPLE OF SHARING INPUTS

One objective of a good lease is to have both the landlord and tenant motivated to maximize the net income to the farm. A rented farm should produce the same level of production and use the same quantity of inputs as a farm operated by the owner. A share lease that does not include sharing certain production costs will not accomplish this objective.

Figure 1 illustrates this situation. The curves show the yield response of corn to in-season irrigation (preplant irrigation water is not shown in the figure). This corn-water relationship was developed by Dr. John Shipley, Texas Agricultural Experiment Station, Etter, Texas. The top curve labeled "owner" is the quantity of corn produced from the different levels of irrigation water applied. For example, 24 acre-inches of seasonal water produced 150 bushels of corn.

The lower curve labeled "tenant" is exactly 2/3 of the upper curve, i.e., for any point on the owner's curve, the tenant's curve is 2/3 of the distance to the horizontal axis of the chart. This represents the tenant's share of the total production. Notice, however, the tenants's curve is not the same shape as the owner's curve. As the quantity of water is increased, the tenant's curve (yield) is "flatter" than the owner's curve.

The most profitable quantity of any variable input can be determined from response relationships such as the one illustrated for corn and irrigation water. In addition to the response curve, the value of output (price per bushel) and the cost of each unit of input (dollars per acre-inch) must be known. A line with the slope of the ratio of water cost to corn price set tangent to the response curve will specify the optimum quantity of water to apply.

Lines A, B and C are price relationships. Assuming it costs $3.50 to apply an acre-inch of water (fuel, repairs and labor) and corn is $2.10 per bushel, then the ratio of water cost to corn value is 1:1.667 (3.50:2.10). That ratio is represented by price line A. Price line A touches the owner's curve at Point Y_1. This means the application of more than 24 acre-inches of water would be uneconomical; i.e., at a $3.50:$2.10 ratio, 24 acre-inches of water will maximize profit from irrigation.

Dotted line B is parallel to Line A and touches the tenant's curve. Since the tenant's curve is flatter, it touches at Y_2. This indicates that the tenant (if he pays the full cost of water) can economically apply only about 21 acre-inches or about one less irrigation. Less water would be used, yield would be reduced, and net income to the farm would be lowered. Since it is economical for the owner to apply more water than the tenant can apply, this arrangement violates the basic goal of equitable share leases; i.e., to maximize the net income to the farm (regardless of who farms it).

Line C is a price ratio line where the landlord and tenant share the cost of irrigation in the same proportion as they share incomes, 1/3 to 2/3. This line touches the tenant's curve at Y_3. Thus, when the costs are shared, it is economical for the tenants to apply the same level of water as indicated for the owner-operator. This example illustrates the principle that landlords and tenants must share yield-increasing variable expenses in the same ratio as they share income to have an equitable lease and maximize net income from the farm.

While Figure 1 only applies to water, there are similar relationships for all other yield determining inputs such as fertilizer, insecticide, herbicide, etc. In each case, if the tenant pays all of the cost and shares the yield, he cannot economically apply the same quantity of input and produce the same yield as an owner-operator. Harvest costs are a function of yield level and, therefore, should also be shared in the same percentage as the other inputs.

Because lease arrangements become deeply entrenched in tradition, they are seldom changed as technology and economic factors change. Terms of a lease which may have been very desirable in the past can become undesirable.

VARIABLE CROP-SHARE RENT

A compromise to the traditional share lease that has interested some landowners and tenants is a variable crop-share rent. Under this rental arrangement, the shareing ratio changes for different price levels.

The concept of variable crop-share rent presented herein allocates income first to cover the total variable costs of producing the crop. Returns above variable costs are shared between the landowner and tenant at a predetermined rate.

To implement this variable share arrangement, certain data must be available and decisions must be made. The five steps listed below detail these items.

Step 1. Estimate the total variable cost (TVC) of the crop. The TVC includes everything but depreciation, land tax and interest on investment (land and machinery). See Appendix 1 - Sample Crop Budgets.

Step 2. Decide which costs are to be shared and which will be paid by the tenant. The sharing rate or percent of these costs to be paid by the tenant (landowner) will be determined later.

Step 3. Decide on the terms of estimating crop price, e.g., the market price at the local elevator on a certain day of the harvest, or the average of four Thursday prices, or the futures market on a certain day, etc.

Step 4. Estimate additional income from the crop: grazing, cottonseed, etc.

Step 5. Set the percentage split of all income above total variable costs (TVC). This division is subject to negotiation when establishing the lease.

After determining how the return above variable costs will be shared and the method of pricing of the product after harvest, no further action need be taken until the crop is harvested and the sharing price is set. At that time, the actual outlay of variable costs (shared and non-shared) can be determined. (However, many individuals will want to estimate these outlays to test the probable sharing ratios before committing themselves to this technique.)

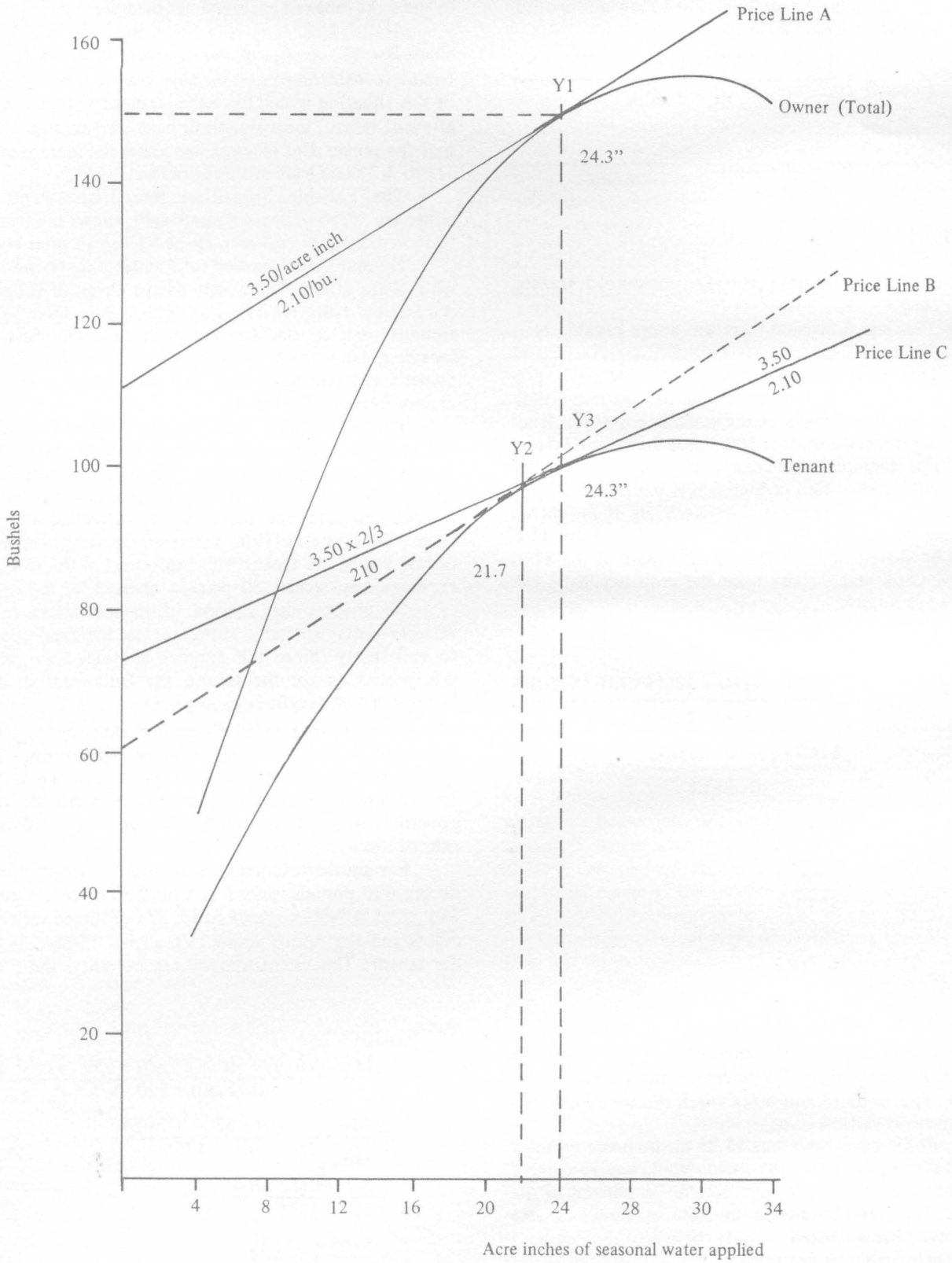

Figure 1. The corn yield response from additional acre inches of water platted for owner and tenant operator on a 1/3 share lease.

After harvest, calculate the percentage sharing that will give the landowner and tenant the predetermined split of income over TVC. The following equation is the basis for the rent share calculation:

$$\text{Share}_{(\text{tenant})} = \frac{\text{Tenant's NVC} + (\text{YP} + 0 - \text{TVC})\, R_T}{\text{YP} + 0 - \text{SVC}}$$

Where:
NVC = Nonshared variable costs
SVC = Shared variable costs
TVC = Total variable costs
Y = Yield
P = Price
0 = Other income from the crop (i.e., cottonseed, grazing, etc.)
R_T = Percentage division of return above variable costs to tenant

This equation will calculate the tenant's percentage share of the crop and his percentage responsibility for the shared items of the variable costs. The landowner's percentage share is 100 minus the tenant's share.

For example, assume a corn crop of 8,000 lbs. The method identified in Step 3 sets the price at $4.75 cwt and the total variable costs are $250. If the shared variable costs equal $110 and if the return above TVC is to be shared equally, the tenant's share of the $110 shared costs and income from the crop would be calculated as follows:

$$\text{Share}_{(\text{tenant})} = \frac{(\$250 - \$110 + [80(\$4.75) - \$250].5}{80(\$4.75) - \$110}$$

$$= \frac{\$140 + (\$380 - \$250).5}{\$380 - \$110}$$

$$= \frac{\$140 + (\$130).5}{\$270}$$

$$= \frac{\$205}{\$270}$$

$$= .759 \text{ or } 76 \text{ percent}$$

In this example, the tenant would get 76 percent of the income and pay 76 percent of the shared variable costs. The landlord and tenant each receive 50% of the income over variable costs.

If the corn price was $5.25 at the predetermined day(s) for setting price, the tenant would pay 73 percent of the variable expenses and receive 73 percent of the crop. This ratio results in the returns above variable expenses being shared equally between the landlord and tenant at the higher price.

Table 1 compares alternative rental arrangements for the corn example: 1/3 and 2/3 no sharing (of variable inputs), 1/3 and 2/3 share of costs and income, and two variable sharing leases. Three price levels are presented to show the range of costs and net incomes.

At the $3.75/cwt corn price, the "1/3 to 2/3 No Share Rental" agreement would result in a loss to the tenant (considering only variable costs). Continuation of this situation would force the landlord to find a more efficient tenant, farm himself or have the land idle. Note that the tenant also incurs a loss under the more typical 1/3 to 2/3 share lease at this price level.

The Variable Crop-Share Rental agreement, at either the 50/50 or 35/65 percent split, allows the tenant to recover his cash cost even at the $3.75/cwt price level.

If gross returns exceed total variable costs, the variable share arrangements will always cover all variable production costs regardless of who incurs them. The formula used to establish the percentage split first allocates gross income to cover all variable costs (landowner's and tenant's), and then divides any remaining income between the parties.

Because of this characteristic, landowners using the variable share approach should be prepared for drastic divisions in poor years. When gross returns are approximately the same as total variable costs, covering the costs allocates the income to the individual who incurred the expenses. Thus, at extremely low prices and/or low yields, the tenant who bears most of the variable expenses may receive 90 percent or more of the crop.

Negotiating the division of income above total variable costs is vitally important to the final profit to each party. Since this approch provides substantial risk protection for the tenant, the landowner should be expected to benefit in good years.

Note that the 35/65 division of return above TVC illustrated in Table 1 is an example. As the price increases, the sharing ratio declines rapidly and the net to the landowner increases. The tenant sacrifices the potential of larger profits in good years for reduced risks of loss in poor years.

For another example, consider a cotton crop producing 600 pounds, priced at $.60, $30 of cottonseed, with total variable costs of $180, $75 of shared variable inputs and the return above TVC shared 45 percent to the tenant. The calculation of tenant rental share is:

$$\text{Share}_{\text{Tenant}} = \frac{(\$180 - \$75) + [(600)(\$.60) + \$30 - \$180].45}{600(\$.60) + \$30 - \$75}$$

$$= \frac{\$105 + (\$360 + \$30 - \$180).45}{\$360 + \$30 - \$75}$$

$$= \frac{\$105 + (\$210).45}{\$315}$$

$$= \frac{\$105 + \$94.50}{\$315}$$

$$= .633 \text{ or } 63 \text{ percent}$$

Table 1. Comparison of variable costs and net income for landlord and tenant for 4 rental agreements at 3 price levels.

CORN
YIELD: 8000
TVC $250

Price/cwt	1/3 - 2/3 No Share[1]				1/3 - 2/3 Share[2]				Variable Crop-Share Lease									
	Landlord		Tenant		Landlord		Tenant		35/65 Share Net[3]					50/50 Share Net[4]				
									Landlord		Tenant		T%	Landlord		Tenant		T%
	Cost	Net	Cost	Net	Cost	Net	Cost	Net	Cost	Net	Cost	Net		Cost	Net	Cost	Net	
5.25	8	117	242	53	37	103	213	67	40	111	210	59	64	30	85	220	85	73
4.50	8	104	242	(6)	37	83	213	27	32	72	218	38	71	24	55	226	55	78
3.75	8	92	242	(42)	37	62	213	(12)	19	32	231	18	83	14	25	236	25	87

[1] "No share" assumes the landowner would only pay maintenance on some irrigation equipment ($4) and the drying costs his share of corn ($4) per acre.

[2] This lease arrangement assumes the landowner pays 1/3 of $110 of variable inputs.

[3] Variable crop-share ratios calculated sharing returns above variable costs 35 percent to tenant and 65 percent to the landowner.

[4] Variable crop-share ratios calculated with landowner and tenant sharing returns above variable costs equally.

In this example, the tenant receives 63 percent of the crop and landowner 37 percent. The shared variable costs are split on the same percentages. Below are details of the income and expenses in this example.

	Tenant	Landowner	Total
Gross Return	$247.00	$143.00	$390
Shared Variable Costs	47.50	27.50	75
Nonshared Variable Costs	105.00	0	105
Net Return Above Variable Costs	94.50	115.50	210

The following worksheet (see Figure 2, page 6) can be substituted for the equations used in the previous examples. The cotton problem is illustrated in the sample worksheet.

The concept of variable crop-share rentals has appeal for landowners and tenants who are seeking some change in current sharing arrangements. However, before anyone commits to this alternative, a detailed study should be made of the relative economics of using variable crop-share arrangements.

In Appendix 1 of this publication are sample budgets for the primary crops in Texas and guidelines to use in preparing estimates of variable costs applicable to particular farms.

Appendix 2 contains a procedure to develop estimates of your relative fixed contribution to the crop. This information can be helpful in negotiating the sharing of returns above variable costs.

In Appendix 3 are a series of tables that may be helpful to individuals in ascertaining the crop division that would occur under various circumstances. Sharing ratios for various price levels, different levels of shared variable costs and two sharings of returns above total variable costs (TVC) are shown for cotton, wheat, corn and sorghum.

Figure 2. SAMPLE COTTON PROBLEM

WORKSHEET TO CALCULATE VARIABLE SHARE RENT

1.	Crop yield		600 lbs.	
2.	Price of product		$ .60	
3.	Multiply yield times price (1 x 2)		$360	
4.	Other income if any (cottonseed)		$ 30	
5.	Add lines 3 and 4			$390
6.	Total variable production costs		$180	
7.	Total shared variable production costs		$ 75	
8.	Tenant's non-shared variable production costs		$105	
9.	Landlord's non-shared variable production costs		0	
10.	Division of return above variable cost	A. Tenant	45%	
		B. Landlord	55%	

Compute tenant's share

11.	Line 5	390	minus Line 6	180	=	$ 210	
12.	Line11	210	times 10A	.45	=	$ 94.50	
13.	Line 12	94.50	plus Line 8	105	=	$ 199.50	
14.	Line 5	390	minus Line 7	75	=	$ 315	
	Line 13	199.50	÷ Line 14	315	– Tenant's Share =		.633 or 63%

Compute landlord's share

15.	Line 5	390	minus Line 6	180	=	$ 210	
16.	Line 15	210	times Line 10B	.55	=	$ 115.50	
17.	Line 16	115.50	plus Line 9	0	=	$ 115.50	
18.	Line 5	390	minus Line 7	75	=	$ 315	
	Line 17	115.50	÷Line 18	315	–Landlord's share		.366 or 37%

WORKSHEET TO CALCULATE VARIABLE SHARE RENT

1.	Crop yield			
2.	Price of product			
3.	Multiply yield times price (1 x 2)			
4.	Other income if any (cottonseed)			
5.	Add lines 3 and 4			
6.	Total variable production costs			
7.	Total shared variable production costs			
8.	Tenant's non-shared variable production costs			
9.	Landlord's non-shared variable production costs			
10.	Division of return above variable cost	A. Tenant		
		B. Landlord		

Compute tenant's share

11.	Line 5		minus Line 6		=		
12.	Line11		times 10A		=		
13.	Line 12		plus Line 8		=		
14.	Line 5		minus Line 7		=		
	Line 13		÷ Line 14		– Tenant's Share =		

Compute landlord's share

15.	Line 5		minus Line 6		=		
16.	Line 15		times Line 10B		=		
17.	Line 16		plus Line 9		=		
18.	Line 5		minus Line 7		=		
	Line 17		÷Line 18		–Landlord's share		

APPENDIX 1

SAMPLE COST AND RETURN BUDGETS

FOR TEXAS CROPS

Sample budgets for cotton, sorghum, corn and wheat are included along with blank budget forms to develop individual cost and return estimates. The examples illustrate a format to use rather than provide accurate data useful to all producers. However, the Texas Agricultural Extension Service annually updates the projections for all major crop enterprises in each soil resource area in the state. This information is available at each county Extension office.

Table 1-A. Cotton, Irrigated, Texas High Plains III Region estimated costs and returns per acre (Furrow). Preplant plus one postplant (Projected for 1978).

	Unit	Price or Cost/Unit	Quantity	Value or Cost
1. Gross Receipts from Production				
Cotton Lint	Lbs.	0.44	500.00	$ 220.00
Cottonseed	Ton	60.00	0.35	21.00
Total				$ 241.00
2. Variable Costs				
Preharvest				
Seed	Lbs.	0.33	20.00	$ 6.60
Fert. (40-20-0)	Acre	10.40	1.00	10.40
Herbicide	Acre	7.00	1.00	7.00
Hail Insurance	Dol.	0.12	110.00	13.20
Machinery	Acre	4.60	1.00	4.60
Tractors	Acre	8.03	1.00	8.03
Irrigation Machinery	Acre	18.36	1.00	18.36
Labor (Tractor & Machinery)	Hour	5.00	3.58	17.92
Labor (Irrigation)	Hour	5.00	3.00	15.00
Other Labor	Hour	2.50	3.00	7.50
Interest on Op. Cap.	Dol.	0.10	38.49	3.85
Subtotal, Pre-Harvest				$ 112.46
Harvest Costs				
Gin, Bag, Ties	Cwt.	1.75	22.00	38.50
Custom Harv. & Haul	Cwt.	1.00	22.00	22.00
Subtotal, Harvest				60.50
Total Variable Costs				$ 172.96
3. Income above variable costs				$ 68.04

Table 1-B. Corn, Irrigated, Texas High Plains III Region estimated costs and returns per acre. Furrow irrigation system (Projected for 1978).

	Unit	Price or Cost/Unit	Quantity	Value or Cost
1. Gross Receipts from Production				
Corn	Bu.	1.95	140.00	$ 273.00
Total				$ 273.00
2. Variable Costs				
Preharvest				$
Seed	Lbs.	0.90	18.00	16.20
Insecticide	Acre	7.50	1.00	7.50
Fert. (140-40-0)	Acre	30.40	1.00	30.40
Herbicide	Acre	5.50	1.00	5.50
Machinery	Acre	4.91	1.00	4.91
Tractors	Acre	11.86	1.00	11.86
Irrigation Machinery	Acre	44.01	1.00	44.01
Labor (Tractor & Machinery)	Hour	5.00	4.85	24.25
Labor (Irrigation)	Hour	5.00	6.75	33.75
Interest on Op. Cap.	Dol.	0.10	58.39	5.84
Subtotal, Pre-Harvest				$ 184.21
Harvest Costs				
Custom Combine	Bu.	0.20	140.00	28.00
Custom Haul	Bu.	0.10	140.00	14.00
Custom Drying	Bu.	0.10	140.00	14.00
Subtotal, Harvest				$ 56.00
Total Variable Cost				$ 240.21
3. Income above variable costs				$ 32.79

Table 1-C. Grain sorghum, Irrigated, Texas High Plains III Region estimated costs and returns per acre (Furrow). Preplant plus three postplant (Projected for 1978).

	Unit	Price or Cost/Unit	Quantity	Value or Cost
1. Gross receipts from Production				
Grain sorghum	Cwt.	3.30	58.00	$ 191.40
Total				$ 191.40
2. Variable Costs				
Preharvest				
Seed	Lbs.	0.40	12.50	$ 5.00
Fert (120-40-0)	Acre	27.20	1.00	27.20
Herbicide	Acre	3.85	1.00	3.85
Insecticide	Acre	5.00	1.00	5.00
Machinery	Acre	4.10	1.00	4.10
Tractors	Acre	9.03	1.00	9.03
Irrigation Machinery	Acre	35.86	1.00	35.86
Labor (Tractor & Machinery)	Hour	5.00	3.75	18.73
Labor (Irrigation)	Hour	5.00	5.50	27.50
Interest on op. cap.	Dol.	0.10	40.37	4.04
Subtotal, Pre-harvest				$ 140.31
Harvest Costs				
Custom Combine	Cwt.	0.30	58.00	$ 17.40
Custom Haul	Cwt.	0.25	58.00	14.50
Subtotal, Harvest				$ 31.90
Total Variable Cost				$ 172.21
3. Income above variable costs				$ 19.19

Table 1-D. Wheat, Irrigated, Texas High Plains III Region estimated costs and returns per acre (Furrow). Preplant plus three postplant (Projected for 1978).

	Unit	Price or Cost/Unit	Quantity	Value or Cost
1. Gross receipts from production				
Wheat	Bu.	2.20	40.00	$ 88.00
Grazing	Lbs.	0.30	200.00	60.00
Total				$ 148.00
2. Variable Costs				
Preharvest				
Seed	Bu.	4.10	1.50	$ 6.15
Fert. (100-40-0)	Acre	24.00	1.00	24.00
Hail Insurance	Dol.	0.10	110.00	11.00
Machinery	Acre	3.15	1.00	3.15
Tractors	Acre	3.59	1.00	3.59
Irrigation Machinery	Acre	35.86	1.00	35.86
Labor (Tractor & Machinery)	Hour	5.00	2.05	10.26
Labor (Irrigation)	Hour	5.00	2.20	11.00
Interest on op. cap.	Dol.	0.10	55.64	5.56
Subtotal, Pre-Harvest				$ 110.58
Harvest Costs				
Custom Combine	Acre	8.50	1.00	$ 8.50
Custom Haul	Bu.	0.15	40.00	6.00
Subtotal, Harvest				$ 14.50
Total Variable Cost				$ 125.08
3. Income above variable costs				$ 22.92

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Estimated Costs and Returns Per Acre

	Unit	Price or Cost/Unit	Quantity	Value or Cost
1. Gross Receipts				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Total				_____
2. Variable Costs				
Preharvest				
Seed	_____	_____	_____	_____
Fertilizer	_____	_____	_____	_____
Herbicide	_____	_____	_____	_____
Insecticide	_____	_____	_____	_____
Fungicide	_____	_____	_____	_____
Hail Insurance	_____	_____	_____	_____
Tractors & Mach.	_____	_____	_____	_____
Irrigation Oper.	_____	_____	_____	_____
Labor	_____	_____	_____	_____
Other	_____	_____	_____	_____
Other	_____	_____	_____	_____
Other	_____	_____	_____	_____
Interest on Oper. Cap.	_____	_____	_____	_____
Subtotal, Preharvest				
Harvest Costs				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Subtotal, Harvest				_____
Total Variable Costs				_____
Income Above Variable Costs				_____

CROP_____

Estimated Costs and Returns Per Acre

	Unit	Price or Cost/Unit	Quantity	Value or Cost
1. Gross Receipts				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Total				_____
2. Variable Costs				
Preharvest				
Seed	_____	_____	_____	_____
Fertilizer	_____	_____	_____	_____
Herbicide	_____	_____	_____	_____
Insecticide	_____	_____	_____	_____
Fungicide	_____	_____	_____	_____
Hail Insurance	_____	_____	_____	_____
Tractors & Mach.	_____	_____	_____	_____
Irrigation Oper.	_____	_____	_____	_____
Labor	_____	_____	_____	_____
Other	_____	_____	_____	_____
Other	_____	_____	_____	_____
Other	_____	_____	_____	_____
Interest on Oper. Cap.	_____	_____	_____	_____
Subtotal, Preharvest				_____
Harvest Costs				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Subtotal, Harvest				_____
Total Variable Costs				_____
Income Above Variable Costs				_____

CROP_____

Estimated Costs and Returns Per Acre

	Unit	Price or Cost/Unit	Quantity	Value or Cost
1. Gross Receipts				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Total				_____
2. Variable Costs				
Preharvest				
Seed	_____	_____	_____	_____
Fertilizer	_____	_____	_____	_____
Herbicide	_____	_____	_____	_____
Insecticide	_____	_____	_____	_____
Fungicide	_____	_____	_____	_____
Hail Insurance	_____	_____	_____	_____
Tractors & Mach.	_____	_____	_____	_____
Irrigation Oper.	_____	_____	_____	_____
Labor	_____	_____	_____	_____
Other	_____	_____	_____	_____
Other	_____	_____	_____	_____
Other	_____	_____	_____	_____
Interest on Oper. Cap.	_____	_____	_____	_____
Subtotal, Preharvest				_____
Harvest Costs				
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Subtotal, Harvest				_____
Total Variable Costs				_____
Income Above Variable Costs				_____

APPENDIX 2

PROCEDURE FOR ESTIMATING FIXED CONTRIBUTION

In traditional share rentals, the landowner usually provides land, fences, buildings and irrigation equipment. The tenant, on the other hand, usually provides machinery, labor and management. To adequately value these items, an understanding of the concepts of fixed cost is necessary.

FIXED (OWNERSHIP) COSTS of particular assets consist primarily of depreciation and interest on investment. These costs are not always apparent because they do not require annual cash outlays. However, they are real costs of owning business assets. Depreciation is the decline in value of an asset due to use and obsolescence. Interest on investment is the opportunity cost (return given up) of investing in that asset. In other words, if an individual had not purchased farmland or machinery, he could have purchased stocks, bonds or savings accounts which would have produced some return.

Other items that may be considered as fixed costs are taxes, insurance, general labor and management. Some of these costs are incurred whether or not the business operates, but all are normally independent of the particular enterprises selected or the level of production. They do not vary with production; thus, they may be considered fixed for this analysis.

The fixed contribution of the landowner and the tenant can be estimated by valuing their fixed assets and summarizing the costs associated with them. The following worksheet and instructions provide the format for this task, and the example is included as an aid in following the instructions.

INSTRUCTIONS FOR TABLE 2-A

INTEREST ON INVESTMENT

ITEM 1A Interest on investment for all business assets is determined by multiplying the value times an opportunity rate of return. Enter the value of the farmland in column 2. If the market value does not reflect agricultural productivity (because of urban influence, mineral value, etc.), adjust to agricultural value. This value should be what a normal buyer and seller might agree on, given adequate time and with normal terms of sale.

The interest rate, column 3, should be the opportuntiy cost of money. Use a rate that an investor should expect from other investments with similar risks and opportunities. The current mortgage rate might provide a starting point. Multiply column 2 times column 3 and enter in column 4. Carry this figure to column 5 for the landowner.

EXAMPLE: 630 acres of farmland valued at $500 per acre = $315,000 entered on line 1A, column 2. In column 3 an interest rate of 8% is entered. The interest on investment in land ($315,000 times .08) $25,200 is entered in columns 4 and 5.

ITEM 1B Enter the current value of farm buildings in column 2. Select an interest rate, calculate return on investment and enter in columns 4 and 5, assuming that tenant will be using or benefiting from the buildings.

EXAMPLE: Farm building value is $30,000 times 8% = $2,400.

ITEMS 1C-E Enter the current value of the assets described in column 1. The interest rates selected for these assets may justifiably be higher than those used for land and buildings. Current rates paid on chattel mortgages may provide some basis. Complete these rows, assigning the interest on investment to the landowner and/or tenant based on ownership.

EXAMPLE: Assume that the tenant's current value in machinery (other than irrigation) is $80,000 used only on this land (or prorated value of total machinery owned over acres operated). At an interest rate of 9%, interest on investment in machinery is $7,200 for the whole farm and for the tenant. No livestock are used in this example so line 1D is blank. The irrigation system is owned in part by the landowner and the remainder by the tenant. Assume that the total current value of irrigation equipment (excluding wells and underground pipelines which are part of the real estate) is $55,000. If the landowner owns the pumps valued at $40,000 and the tenant owns engines and surface pipe valued at $15,000, the interest on investment for the landowner would be $3,600 ($40,000 times .09) and the tenant's return on investment would be $1,350 ($15,000 times .09).

DEPRECIATION

ITEMS 2A-C Depreciation of assets should be entered here and assigned according to ownership of the particular assets. Annual depreciation amounts are easily obtained from tax records. However, if accelerated methods of depreciation (declining balance sum of year's digits, and/or additional first year depreciation) are used for tax purposes, some care should be exercised. To the extent that large depreciation expenses in a particular year does not represent the normal loss of value of assets, an adjustment might be necessary. If the straight line method is used, no such problem should occur.

EXAMPLE: In the example, straight line depreciation is used assuming 40 year life of buildings and that they are currently one-half depreciated (60,000 ÷ 40 = 1,500). The current value of machinery ($80,000) is depreciated over 5 years ($80,000 ÷ 5 = 16,000). Irrigation assets present a more complex problem. Wells were not included as separate assets for calculating interest on investment, but they are depreciable assets. Assume $20,000 investment in wells depreciated over 20 years (20,000 ÷ 20 = 1,000). The underground pipeline ($15,000) depreciated over 20 years yields annual depreciation of $750. Pumps at $40,000 spread over 10 years equal $4,000. Engines ($10,000) owned by the tenant, with useful lives of 4 years produce $2,500 annual depreciation. The tenant's surface pipe ($5,000) when spread over 10 years gives $500 annual depreciation.

OTHER FIXED COSTS

ITEM 3 Enter total annual taxes, real estate and personal property, on production assets owned by the tenant and the landowner.

EXAMPLE: Assume landowner's taxes total $1,500 and tenant's total $500.

ITEM 4 Enter insurance costs for property damage and liability on production assets owned by each party.

EXAMPLE: Assume insurance costs at $500 and $1,000 for landowner and tenant, respectively.

ITEM 5 Enter the prorated costs of conservation measures applicable to this year and which will not be a part of the normal crop culture. Assign these between the parties as they will be responsible.

EXAMPLE: None assumed.

ITEM 6 If desired, enter a valuation for management. Usually this will be assigned to the tenant, but in cases where the landowner provides significant management input, the item may be divided between them.

EXAMPLE: A management charge of $7,500 was chosen and entered for the tenant.

ITEM 7 The value of all fixed labor should be entered. Labor hired on a yearly, monthly or hourly basis that will be used in general farm operations should be included. Exclude only hired labor specific to a particular enterprise (such as hoe labor in cotton). Labor provided by the farm operator and his family that is not actually paid should be valued and entered on line 7A, unpaid labor.

EXAMPLE: Assume one full-time, hired hand with total wages of $9,600, and unpaid family labor with total value of $10,000.

ITEM 8 This line may be used to enter any other fixed expenses of the farm for either the landowner or the tenant.

ITEM 9 Total fixed expenses for the whole farm, the landowner, and the tenant by summing column 4, 5, 6 respectively.

EXAMPLE: Total fixed expenses for the farm are $96,600, for the landowner are $40,450, and for the tenant are $56,150.

ITEM 10 Divide line 9, column 4 into line 9, columns 5 and 6 respectively.

EXAMPLE: The landowner contributed 42% of the fixed resources and the tenant contributed 58%.

NOTE: The interest rates used to calculate interest on investment and the amounts allocated to management and labor are subjectively determined. Small changes in especially the interest rates can change the results substantially. Ideally, the tenant and landowner should work together in the final establishment of these values and should both understand that these are subject to negotiation in the process.

TABLE 2-A. LANDLORD AND TENANT'S FIXED CONTRIBUTION - EXAMPLE.

Item of Expense	Estimated Total Value	Estimated Interest Rate	Estimated Annual Cost		
			Whole farm	Landlord's share	Tenant's share
(1)	(2)	(3)	(4)	(5)	(6)
	Dollars	Percent	Dollars	Dollars	Dollars
FIXED COSTS:					
1. Interest on Investment					
A. Land	$315,000	8	$25,200	$25,200	
B. Farm building	30,000	8	2,400	2,400	
C. Tractor, truck, auto & equip.	80,000	9	7,200		$7,200
D. Breeding stock					
E. Irrigation	55,000	9	4,950	3,600	1,350
2. Depreciation					
A. Buildings, fences & other			1,500	1,500	
B. Tractor, truck, automobile & equip.			16,000		16,000
C. Irrigation			8,750	5,750	3,000
3. Taxes			2,000	1,500	500
4. Insurance			1,500	500	1,000
5. Conservation measures					
6. Management			7,500		7,500
7. Labor					
A. Unpaid			10,000		10,000
B. Hired			9,600		9,600
8. Other					
9. Total Fixed Expenses (Lines 1-9)			96,600	40,450	56,150
Percentage of Total Fixed Expenses				42%	58%

TABLE 2-B. LANDLORD AND TENANT'S FIXED CONTRIBUTION - EXAMPLE.

Item of Expense	Estimated Total Value	Estimated Interest Rate	Estimated Annual Cost		
			Whole farm	Landlord's share	Tenant's share
(1)	(2)	(3)	(4)	(5)	(6)
	Dollars	Percent	Dollars	Dollars	Dollars
FIXED COSTS:					
1. Interest on Investment					
A. Land					
B. Farm building					
C. Tractor, truck, auto & equip.					
D. Breeding Stock					
E. Irrigation					
2. Depreciation					
A. Buildings, fences & other					
B. Tractor, truck, automobile & equip.					
C. Irrigation					
3. Taxes					
4. Insurance					
5. Conservation measures					
6. Management					
7. Labor					
A. Unpaid					
B. Hired					
8. Other					
9. Total Fixed Expenses (Lines 1-9)					
Percentage of Total Fixed Expenses					

APPENDIX 3

CALCULATIONS OF SHARING RATIOS FOR COTTON, CORN, SORGHUM AND WHEAT

The following tables show the approximate crop division for irrigated corn and irrigated and dryland cotton, sorghum and wheat for specific situations. Direct interpretation of these tables to any individual farm is not intended or recommended. Rather, these tables are specific examples of the proximate range of variation in crop shares that might occur over a specified range of prices.

To interpret these tables, note that the crop, yield, TVC (total variable cost per acre), share of return above TVC and other income is listed. Different amounts of shared costs are shown along with several prices. Table 3-A was constructed for irrigated corn, yielding 8,000 lbs. per acre. TVC of $250 per acre, a 50/50 share of net above TVC and no other income. If the landowner and tenant share $100 of the variable costs, a $5 price would result in a 75/25 split of the crop. Using the same information except for the division of return above variable costs, a 40/60 division (Table 3-B) would yield a 70/30 split.

Study of these data will provide interested individuals a point of reference in their initial evaluation of the variable sharing technique presented in this publication. However, a final decision should be based on individuals working through the equation in the text or using the worksheets provided. If this technique is implemented, the final division of the crop **must** be determined with the equation and/or worksheet and **must not** be based on the tables in this appendix.

Table 3-A. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

CORN
Yield: 8000 lbs.
TVC - $250
Share of Net Above Variable Cost: 50/50
Other Income per Acre: $0

Price per cwt	Shared Variable Costs per Acre					
	$0	$50	$75	$100	$125	$150
3.50	95/5	93/7	93/7	92/8	90/10	88/12
3.75	92/8	90/10	89/11	88/12	86/14	83/17
4.00	89/11	87/13	86/14	84/16	82/18	79/21
4.25	87/13	84/16	83/17	81/19	79/21	76/24
4.50	85/15	82/18	81/19	79/21	77/23	74/26
4.75	83/17	80/20	79/21	77/23	75/25	72/28
5.00	81/19	79/21	77/23	75/25	73/27	70/30
5.25	80/20	77/23	75/25	73/27	71/29	69/31
5.50	78/22	76/24	74/26	72/28	70/30	67/33

Table 3-B. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

CORN
Yield: 8000 lbs.
TVC - $250
Share of Net Above Variable Cost: 40/60
Other Income per Acre: $0

Price per cwt	Shared Variable Costs per Acre					
	$0	$50	$75	$100	$125	$150
3.50	94/6	92/8	91/9	90/10	88/12	86/14
3.75	90/10	88/12	87/13	85/15	83/17	80/20
4.00	87/13	84/16	83/17	81/19	78/22	75/25
4.25	84/16	81/19	80/20	78/22	75/25	72/28
4.50	82/18	79/21	77/23	75/25	72/28	69/31
4.75	79/21	76/24	74/26	72/28	69/31	66/34
5.00	78/22	74/26	72/28	70/30	67/33	64/36
5.25	76/24	72/28	70/30	68/32	65/35	62/38
5.50	74/26	71/29	69/31	66/34	64/36	61/39

Table 3-C. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

DRYLAND COTTON
Yield: 300 lbs.
TVC - $100
Share of Net Above Variable Cost: 50/50
Other Income per Acre: $15

Price per lb	Shared Variable Costs per Acre			
	$0	$25	$50	$75
.40	87/13	84/16	79/21	71/29
.45	83/17	80/20	75/25	67/33
.50	80/20	77/23	72/28	64/36
.55	78/22	74/26	69/31	62/38
.60	76/24	72/28	67/33	60/40
.65	74/26	70/30	66/34	59/41
.70	72/28	69/31	64/36	58/42
.75	71/29	67/33	63/37	58/42
.80	70/30	66/34	62/38	57/43

Table 3-D. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

DRYLAND COTTON
Yield: 300 lbs.
Share of Net Above Variable Cost: 40/60
Other Income per Acre: $15

Price per lb	Shared Variable Costs per Acre			
	$0	$25	$50	$75
.40	84/16	81/19	75/25	65/35
.45	80/20	76/24	70/30	60/40
.50	76/24	72/28	66/34	57/43
.55	73/27	69/31	63/37	54/46
.60	71/29	66/34	61/39	53/47
.65	69/31	64/36	59/41	51/49
.70	67/33	63/37	57/43	50/50
.75	65/35	61/39	56/44	49/51
.80	64/36	60/40	55/45	48/52

Table 3-E. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

IRRIGATED COTTON
Yield: 600 lbs.
TVC - $175
Share of Net Above Variable Cost: 50/50
Other Income per Acre: $25

Price per lb	Shared Variable Costs per Acre					
	$0	$25	$50	$75	$100	$125
.40	83/17	81/19	79/21	76/24	73/27	68/32
.45	80/20	78/22	76/24	73/27	69/31	65/35
.50	77/23	75/25	73/27	70/30	67/33	63/37
.55	75/25	73/27	70/30	68/32	65/35	61/39
.60	73/27	71/29	69/31	66/34	63/37	60/40
.65	71/29	69/31	67/33	65/35	62/38	59/41
.70	70/30	68/32	66/34	64/36	61/39	58/42
.75	68/32	67/33	65/35	63/37	60/40	57/43
.80	67/33	66/34	64/36	62/38	59/41	57/43

Table 3-F. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

IRRIGATED COTTON
Yield: 600 lbs.
TVC - $175
Share of Net Above Variable Cost: 40/60
Other Income per Acre: $25

Price per lb	Shared Variable Costs per Acre					
	$0	$25	$50	$75	$100	$125
.40	80/20	78/22	75/25	72/28	67/33	61/39
.45	76/24	73/27	71/29	67/33	63/37	58/42
.50	72/28	70/30	67/33	64/36	60/40	55/45
.55	70/30	67/33	65/35	61/39	58/42	53/47
.60	67/33	65/35	62/38	59/41	56/44	52/48
.65	65/35	63/37	61/39	58/42	54/46	50/50
.70	64/36	61/39	59/41	56/44	53/47	49/51
.75	63/38	60/40	58/42	55/45	52/48	49/51
.80	61/39	59/41	56/44	54/46	51/49	48/52

Table 3-G. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

DRYLAND SORGHUM
Yield: 2000 lbs.
TVC - $50
Share of Net Above Variable Cost: 50/50
Other Income per Acre: $0

	Shared Variable Costs per Acre	
Price per cwt	$0	$25
3.25	88/12	81/19
3.50	86/14	78/22
3.75	83/17	75/25
4.00	81/19	73/27
4.25	79/21	71/29
4.50	78/22	69/31
4.75	76/24	68/32
5.00	75/25	67/33
5.25	74/26	66/34

Table 3-H. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

DRYLAND SORGHUM
Yield: 2000 lbs.
TVC - $50
Share of Net Above Variable Cost: 40/60
Other Income per Acre: $0

	Shared Variable Costs per Acre	
Price per cwt	$0	$25
3.25	86/14	78/22
3.50	83/17	73/27
3.75	80/20	70/30
4.00	78/22	67/33
4.25	75/25	65/35
4.50	73/27	63/37
4.75	72/28	61/39
5.00	70/30	60/40
5.25	69/31	59/41

Table 3-I. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

IRRIGATED SORGHUM
Yield: 65 lbs.
TVC - $200
Share of Net Above Variable Cost: 50/50
Other Income per Acre: $0

Price per cwt	Shared Variable Costs per Acre					
	$0	$25	$50	$75	$100	$125
3.25	97/3	97/3	97/3	96/4	95/5	93/7
3.50	94/6	93/7	92/8	91/9	89/11	87/13
3.75	91/9	90/10	89/11	87/13	85/15	82/18
4.00	88/12	87/13	86/14	84/16	81/19	78/22
4.25	86/14	85/15	83/17	81/19	78/22	75/25
4.50	84/16	83/17	81/19	79/21	76/24	72/28
4.75	82/18	81/19	79/21	77/23	74/26	70/30
5.00	81/19	79/21	77/23	75/25	72/28	69/31
5.25	79/21	78/22	76/24	73/27	71/29	67/33

Table 3-J. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

IRRIGATED SORGHUM
Yield: 65 lbs.
TVC - $200
Share of Net Above Variable Cost: 40/60
Other Income per Acre: $0

Price per cwt	Shared Variable Costs per Acre					
	$0	$25	$50	$75	$100	$125
3.25	97/3	96/4	96/4	95/5	94/6	92/8
3.50	93/7	92/8	91/9	89/11	87/13	84/16
3.75	89/11	88/12	86/14	84/16	82/18	78/22
4.00	86/14	85/15	83/17	81/19	78/22	73/27
4.25	83/17	82/18	80/20	77/23	74/26	70/30
4.50	81/19	79/21	77/23	74/26	71/29	67/33
4.75	79/21	77/23	75/25	72/28	69/31	64/36
5.00	77/23	75/25	73/27	70/30	67/33	63/37
5.50	75/25	73/27	71/29	68/32	65/35	61/39

Table 3-K. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

DRYLAND WHEAT
Yield: 20 lbs.
TVC - $75
Share of Net Above Variable Cost: 50/50
Other Income per Acre: $25

	Shared Variable Costs per Acre		
Price per bushel	$0	$25	$50
2.50	100/0	100/0	100/0
2.75	97/3	95/5	92/8
3.00	94/6	92/8	86/14
3.25	92/8	88/12	81/19
3.50	89/11	86/14	78/22
3.75	88/12	83/17	75/25
4.00	86/14	81/19	73/27
4.25	84/16	79/21	71/29
4.50	83/17	78/22	69/31

Table 3-L. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

DRYLAND WHEAT
Yield: 20 lbs.
TVC - $75
Share of Net Above Variable Cost: 40/60
Other Income per Acre: $25

	Shared Variable Costs per Acre		
Price per bushel	$0	$25	$50
2.50	100/0	100/0	100/0
2.75	96/4	95/5	90/10
3.00	93/7	90/10	83/17
3.25	90/10	86/14	78/22
3.50	87/13	83/17	73/27
3.75	85/15	80/20	70/30
4.00	83/17	78/22	67/33
4.25	81/19	75/25	65/35
4.50	79/21	73/27	63/37

Table 3-M. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

IRRIGATED WHEAT
Yield: 40 lbs
TVC - $150
Share of Net Above Variable Cost: 50/50
Other Income per Acre: $60

Price per bushel	Shared Variable Costs per Acre					
	$0	$25	$50	$75	$100	$125
2.50	97/3	96/4	95/5	94/6	92/8	86/14
2.75	94/6	93/7	92/8	89/11	86/14	78/22
3.00	92/8	90/10	88/12	86/14	81/19	73/27
3.25	89/11	88/12	86/14	83/17	78/22	69/31
3.50	88/12	86/14	83/17	80/20	75/25	67/33
3.75	86/14	84/16	81/19	78/22	73/27	65/35
4.00	84/16	82/18	79/21	76/24	71/29	63/37
4.25	83/17	80/20	78/22	74/26	69/31	62/38
4.50	81/19	79/21	76/24	73/27	68/32	61/39

Table 3-N. APPROXIMATE TENANT/LANDOWNER SHARE RATIOS.

IRRIGATED WHEAT
Yield: 40 lbs.
TVC - $150
Share of Net Above Variable Cost: 40/60
Other Income per Acre: $60

Price per bushel	Shared Variable Costs per Acre					
	$0	$25	$50	$75	$100	$125
2.50	96/4	96/4	95/5	93/7	90/10	83/17
2.75	93/7	92/8	90/10	87/13	83/17	73/27
3.00	90/10	88/12	86/14	83/17	78/22	67/33
3.25	87/13	85/15	83/17	79/21	73/27	63/37
3.50	85/15	83/17	80/20	76/24	70/30	60/40
3.75	83/17	81/19	78/22	73/27	67/33	58/42
4.00	81/19	78/22	75/25	71/29	65/35	56/44
4.25	9/21	77/23	73/27	69/31	63/37	54/46
4.50	78/22	75/25	72/28	67/33	61/39	53/47

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Cooperative Extension Work in Agriculture and Home Economics, The Texas A&M University System and the United States Department of Agriculture cooperating. Distributed in furtherance of the Acts of Congress of May 8, 1914, as amended, and June 30, 1914.
1½ M—9-80, Reprint ECO 7